MS221 Mailing 1 SP

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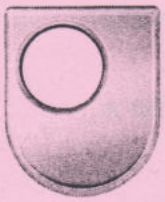
Stop Press
Read this first!



Faculty of Mathematics and Computing

MS221 – Exploring mathematics
Mailing 1 Stop Press 2006

Contents **Page**

1 Introduction

This is the first main course mailing for MS221. There will be a second later in the year containing Blocks C and D. Please open each mailing as soon as it arrives in case there is information in a Stop Press concerning a current assignment.

2 Essential course information

(i) Errata

You may find, if you have received the latest edition of any of these texts, that some of the corrections below have already been made. Apologies for the inconvenience caused by these errata. Note that a negative line reference indicates counting from the bottom of the page.

MS221 Handbook

Page 3 Boxed text: combine 2nd and 3rd paragraph to read:

If you are taking MST121 and MS221 together, then we suggest that you use the MS221 Handbook for both courses. You are allowed to annotate this combined handbook, and to take it into the examination (with the MST121 Handbook, if you wish).

Page 13 Under **closed form** add:

… It should be accompanied by a statement of the appropriate range for n.

Page 37 Immediately above *Calculating means* add:

Surds

A surd is an expression for the exact value of an irrational number that contains one or more roots of integers. For example, $\sqrt{2}$, $\sqrt[4]{5}$ and $\sqrt[3]{5} + \sqrt[4]{2}$.
A surd may also be represented by an expression involving powers such as $a^{1/n}$ or $a^{m/n}$ where a is a positive integer, n and m are integers, and the expression does not simplify. For example, $2^{1/2}$, $5^{1/4}$ and $3\times5^{1/3} + 4\times2^{1/2}$.

Page 44 Underneath line 5 add:

Combining these results gives $x = \log_a\left(a^x\right)$, for x in $\mathbb{R}$, and $y = a^{\log_a y}$, for $y>0$.

Page 69 Replace heading '***Motion with constant acceleration***' with '***Modelling motion***'

Page 80 line 5

$$a_n z^n + a_{n-1} z^{n-1} + \cdots + a_1 z + a_0 = a_n (z-\alpha_1)(z-\alpha_2)\cdots(z-\alpha_n)$$

MS221 Chapter A1

Page 5 add to end of Study guide

> The optional Video Band A(i) *Algebra workout - Rearranging formulas* could be viewed at any stage during your study of this chapter.

Page 23 Immediately above Activity 3.1

If there is a '15' present, this can be deleted.

MS221 Chapter A2

Page 4 add to end of Study guide

> The optional Video Band A(ii) *Algebra workout - Square roots* could be viewed at any stage during your study of this chapter.

Page 36 Frame 2

Solutions are given on **page 53**.

Page 37 Frame 4

Solutions are given on **page 53**.

Page 39 Figure 5.1

The top left quadrant of the circle should have an arrow head on it pointing in the anticlockwise direction.

Page 49 Solution 1.1(c)

… a pair of **parallel** lines;.

MS221 Chapter A3

Page 4 add to end of Study guide

> The optional Video Band A(iv) *Algebra workout - Trigonometry* could be viewed at any stage during your study of this chapter.

Page 18 first margin note should be on the left at the bottom of first paragraph, and read:

Once again, minor differences between the motifs are ignored.

Page 29 line 8

…, where the **line** *OP* makes the angle …

MS221 Exercise Booklet A

Page 17 Solution 2.3(d)

The function for the reflection in l is therefore $q_{3\pi/8} : \mathbb{R}^2 \to \mathbb{R}^2$

Chapter B1

Page 5 add to end of Study guide

> The optional Video Band B(i) *Algebra workout - Binomial Theorem* could be viewed at any stage during your study of this chapter.

Page 26 line 6

… this convergence was illustrated for $x_0 = 0$ and for $x_0 = 5$ in Activity 1.6(**b**). …

Page 30 Figure 2.11

$x_0 = -\frac{1}{2}$

Page 54 Solution 3.3(b)

Thus x_n does not seem to tend to the 2-cycle $\boldsymbol{a \approx 1.618, b \approx -1.618}$.

Chapter B2

Page 4 add to end of Study guide

> The optional Video Band B(ii) *Algebra workout - Finding matrix transformations* could be viewed at any stage during your study of this chapter.

Page 58 Figure S.12

Add in the gridlines in the directions of the vectors **a** and **b**.

Page 60 Figure S.18

$k = 0$ should appear in a 'cloud' alongside the line $3x + y = 0$.

Page 62 Figure S.19

f should appear alongside the arrow between the top two grids.

Chapter B3

Page 4 add to end of Study guide

> The optional Video Band B(iii) *Algebra workout - Eigenvectors* could be viewed at any stage during your study of this chapter.

Exercise Booklet B

Page 11 Solution 1.2(b) - *for information*

A quick way to rearrange is to multiply through by $\frac{3}{2}$ to obtain $x + \frac{1}{x^2} = \frac{3}{2}x$.

(ii) Studying MST121 and MS221 together

Enclosed with this mailing you will find a study calendar for 'MS221 only'. If you are studying MST121 as well as MS221 this year you should dispose of the 'MS221 only' calendar and use the combined one for MST121/MS221 which was sent to you in the MST121 mailing. If you are studying both MST121 and MS221 this year, then your first assignment deadline is 22nd February for MST121 TMA01(i). However, you are advised to submit TMA01(i) before that date so that you can make a start on Chapter A1 of MS221 on time, in mid-February.

(iii) Study advice

Read through the *Course Guide* as soon as possible to gain an overview of the course and to help you to plan your study.

An estimate of the amount of time required to study each Chapter is given at the beginning of each Chapter and is discussed in the Course Guide under *Planning your study* in Section 4 These study times are only a guide and will vary from student to student.

In most circumstances it is important to start your study of each chapter at the time indicated in the Study Calendar, even if this means omitting some sections of the previous chapter, for example, those indicated by a margin note as being non-assessed.

If at any stage in the course you find yourself falling behind schedule, please contact your tutor. This is particularly important if, for any reason, you are considering whether to withdraw from the course. Your tutor may be able to help you to devise a strategy to enable you to complete the course.

(iv) Using Mathcad

Advice

You are strongly advised to save your Mathcad files frequently, particularly when you are working on assignment material.

Creating a new worksheet

When creating a new worksheet for your own Mathcad use, make sure that you do so using the 'Normal' worksheet template, as described in Activity 2.3 of MST121 Chapter A0. The 'Normal' template contains some useful features, such as displaying the multiplication sign between two numbers as '×', and using different colours to display mathematical expressions (black) and text (navy blue). These features are *not* available if you use the 'Blank Worksheet' template, or any of the other templates.

Keys

The keys **"** (double-quote, given by [**Shift**]**2**) and **@** (at, given by [**Shift**]**'**) act as keyboard short-cuts for two Mathcad menu commands.

- **"** creates a text region
- **@** creates an X–Y graph

However you may find that the effects of these keys are interchanged; that is, **"** creates an X–Y graph, and **@** creates a text region. There is absolutely no problem in using the two keys this way around. In fact you can avoid the problem altogether by using the mouse and the pull-down menus / toolbar buttons to access these facilities. However, if you do wish to change your keyboard setting and require assistance to do so, then please contact the OU Computing Helpdesk.

Multiplication sign and decimal point

The multiplication sign is entered by typing * (asterisk, given by [**Shift**]**8**, or on the numeric keypad), or by clicking on the '×' button on the 'Calculator' toolbar. Mathcad initially displays the multiplication sign as a small raised dot, but once Mathcad can identify what is being multiplied, it is able to display the multiplication in an appropriate form. So, Mathcad displays the multiplication sign × between two numbers, but doesn't display anything between two brackets or between a number and a bracket. For example, Mathcad displays the product '2 times 4' as 2×4. The decimal point is obtained by typing **.** (a full stop), or by clicking on the '**.**' button on the 'Calculator' toolbar, and is displayed as such, e.g. 2.4 is the value '2 point 4'.

Navigating through a worksheet

In order to use the keys [**Shift**][**PageUp**] / [**Shift**][**PageDown**] or the **Edit**, **Go to Page...** menu option to move through a worksheet from page to page, you must have a working printer set up (though the printer does not need to be switched on).

Replicating mouse actions via the keyboard

Most mouse/click operations in Mathcad have built in keyboard alternatives. For example, menu selections can be made by pressing the [**Alt**] key, followed by the underlined letter in the required menu item, and keystroke alternatives exist for nearly all of the toolbar buttons. However, full use of Mathcad without a mouse requires some way of replicating mouse actions via the keyboard or another input device. In particular, ways are needed to replicate the following mouse actions: clicking on an expression to select it; 'clicking and dragging' to resize a region; or zooming into a graph and tracing out graph coordinates.

One way to control the mouse using the keyboard is to use the *Windows* MouseKeys facility. (Select the **Start** menu, **Settings**, **Control Panel**, then open the **Accessibility Options** item and choose the 'Mouse' tab.) Once MouseKeys is turned on, the keys on the *numeric keypad* can be used to replicate mouse actions provided that the [**Num Lock**] key is turned *off*. The arrow keys can be used to move the mouse arrow (pointer), while clicking the (left) mouse button is replicated by pressing the **5** key, and double-clicking by pressing the **+** key. To click and drag, press the [**Ins**] key to hold down the mouse button, then use the arrow keys to move the mouse arrow, and finally press [**Del**] to release the mouse button.

Rounding/calculating errors
Occasionally you might get a slightly different result when using Mathcad than when using a calculator. This is due to differences in the way the two systems 'round off' answers. In almost all cases the difference in the answers will have no impact on the accuracy required by a particular question or exercise.

(v) Known problems in installing, using and printing in Mathcad

If you need assistance in dealing with any of these problems, or encounter any others when using or printing Mathcad, then please contact the OU Computing Helpdesk.

Calculations 'freeze-up'
When values are changed in a worksheet, on rare occasions Mathcad may 'freeze-up', failing to update the results in a table or to re-draw a graph. It is not clear why this occurs, but such behaviour has been noted both after a large number of calculations or after a particularly complicated calculation. If this problem does occur, then the advice is to save your work in a file, and exit from Mathcad. Everything should be OK if you run Mathcad again and re-open the saved file!

Installing Mathcad with Windows XP or Windows 2000 (at step (f) of Activity 1.1 on page 9 of MST121 Chapter A0 'Starting points')
If you need to re-install Mathcad since studying MST121 (for example, you are using a new computer for MS221) then some of the latest security updates to Windows XP or 2000 may affect the installation of Mathcad. After clicking the **OK** button for the 'Mathcad Serial Number' screen it will disappear leaving the 'Mathcad installation' screen (*Figure 1.3* on page 9) visible. If, after a minute or two, you get no further response then you need to restart the installation, as follows.
1. Close the 'Mathcad installation' screen by clicking on the close button in the top right-hand corner. (Alternatively, press the two keys [Alt] and [F4] together.) This should reveal the 'Installing your software' screen (*Figure 1.2* on page 8).
2. Click on the **Stage 1: Install OU Mathcad** button and, when prompted, key-in the Mathcad installation password again.
3. The installation will restart at step (g) of Activity 1.1 (on page 9) and you can follow the instructions from there onwards.

Odd Pictures or Spaces Replace Mathcad Operators
Symptoms: Mathcad operators, like equals and multiplication signs, are replaced by pictures such as mailboxes, floppy discs, computers, etc., or by white spaces.
Cause 1: Conflict with having an older version of Mathcad on the system. Solution: Uninstall all versions and reinstall only Mathcad 2001i Professional from the course CD-ROM.
Cause 2: Missing or corrupt symbol.ttf font. Solution: install a new copy of the font file symbol.ttf from another computer or your Windows CD.

Printing: unable to print
If your printer has an extremely long name, you could experience a system error when printing in Mathcad. Try shortening the name of the printer icon to prevent this from happening. (Use the **Start** menu, **Settings** ▶ **Printers**, then click on the printer icon and select the **File** menu and **Rename**.)

Printing: black boxes appear
If you print a worksheet containing an operator such as a summation sign, you may see black boxes on the printout if you are printing to a PostScript printer. To correct this, use a non-PostScript printer driver that is compatible with your printer.

Printing: mathematical operators or brackets do not print properly in Windows 98
If you encounter these difficulties and are using a PostScript printer then you may need to adjust your font settings for the printer driver. (Use the **Start** menu, **Settings ► Printers**, then click on the printer icon and select the **File** menu and **Properties**. In the 'Properties' dialog box, choose the 'Fonts' tab and select 'Always use TrueType fonts'.)

Screen 'bounce' and freezing with scroll wheel
With some combinations of computer and mouse, when using the scroll wheel on the mouse to move around in a Mathcad page, the contents of the window on screen start to 'bounce' up and down. This also freezes the application, so that the only way to continue is to close Mathcad via the Task Manager (obtained by pressing [Ctrl][Alt][Del]). All work on the Mathcad worksheet since the previous 'Save' will be lost. A remedy may be to turn off the "Accelerated Scrolling" option in the mouse setup menu (Start menu, Control Panel, ('Printers and other hardware' if set to Category view),'Mouse'. Then in the 'Mouse Properties' box, select the 'Wheel' tab and click to un-tick the 'Enable Accelerated Scrolling' option. (For more, see the MathSoft Technical Support website, http://support.mathsoft.com/KB/article.asp?p=4&a=875.) Alternatively, refrain from using the mouse wheel, but since it is easy to use the wheel inadvertently, save work regularly for any worksheet that you are creating. (If starting from a prepared course worksheet, remember to save your work under a different filename.)

Screen flicker and delay in displaying information
Mathcad automatically refreshes information (expressions, text, graphs and pictures) on the screen, to keep it up to date if changes are made. On some computers this may cause the screen to appear to flicker when scrolling through a worksheet, or to cause a slight delay before information is displayed. (The flicker is most noticeable when scrolling using the arrows on the vertical scroll bar – it may be reduced by using the [**PageUp**] and [**PageDown**] keys to scroll instead.)

Surface and contour plots (Mathcad file 221A3-03)
This specifically refers to Computer Book A, Chapter A3, page 32, optional Activity 5.9 and the Mathcad file 221A3-03 Surface and contour plots. On some computers, Mathcad may crash, freeze or lock up when displaying a 3D graph (the surface and contour plots on page 2 of file 221A3-03). If this occurs, you may need to restart your computer in order to exit Mathcad and return to the desktop. Please note that this file is OPTIONAL, but if you wish to look at it, a solution to the problem is to turn the 'Hardware acceleration' down or off. Further information about this problem can be found on the Mathcad Technical Support website, in their knowledge base, at http://support.mathsoft.com/mcad2001i/article.asp?id=375

Symbolic results not updating
On some computers Mathcad may occasionally fail to update the results of symbolic calculations automatically when changes are made. To make Mathcad update a single result, try clicking anywhere on the symbolic calculation (the expression containing '→') and then pressing the [**F9**] key. If you have several results that need updating, then first try selecting the **Math** menu, and **Calculate Worksheet** - if this fails to solve the problem then update each result in turn, by clicking on it and pressing [**F9**].

Tables of values
On very rare occasions it has been noted that a problem arises with the text style used to display table values. The default style should be Arial font, 9 point size, but for some reason a smaller size is used instead. If this problem occurs and you wish to change the text size in a table, then click on a value in the table with the right mouse button and choose '**Properties...**', followed by the '**Font...**' button, and set the required '**Size**'.

(vi) Audio and video material

Audio

The audio materials for MS221 were originally presented on audio cassette. For that reason, you may come across old references to tapes or cassettes, whereas the material is now presented in digital format. To help you navigate around the audio, we suggest that you note down the track number on your player whenever you are asked to stop or pause the audio material. You should also note the following adjustments to the text referring to the audio material.

Reference	*Current text*	*Replacement text*
A1 page 5	… Section 3 requires the use of an audio cassette player, …	… Section 3 requires the use of an audio CD player, …
A1 page 23	To study Subsection 3.1 you will need a cassette player and Audio Tape 1. *Now listen to Audio Tape 1, Band 1, 'Linear second-order recurrence sequences', while you study the tape frames.*	To study Subsection 3.1 you will need a CD player and CDA5493. *Now listen to CDA5493 (Tracks 1 - 4), band 1, 'Linear second-order recurrence sequences', while you study the frames.*
A2 page 4	… Section 4 requires the use of an audio cassette player, …	… Section 4 requires the use of an audio CD player, …
A2 page 34	To study this section you will need an audio cassette player and Audio Tape 1.	To study this section you will need an audio CD player and CDA5493.
A2 page 35	*Now listen to Audio Tape 1, Band 2, 'Quadratic curves'.*	*Now listen to CDA5493 (Tracks 5 - 6), band 2, 'Quadratic curves'.*
B1 page 5	Section 2 requires the use of an audio cassette player, …	Section 2 requires the use of an audio CD player, …
B1 page 18	To study this section you will need an audio cassette player and Audio Tape 1.	To study this section you will need an audio CD player and CDA5493.
B1 page 19	These are discussed in the audio tape that follows. *Now listen to Audio Tape 1, Band 3, 'Gradients of quadratic graphs'.*	These are discussed in the audio band that follows. *Now listen to CDA5493 (Tracks 7 - 10), band 3, 'Gradients of quadratic graphs'.*
B3 page 4	Section 1 requires the use of an audio cassette player, …	Section 1 requires the use of an audio CD player, …
B3 page 6	To study this section you will need an audio cassette player and Audio Tape 2. In the audio tape, we use … . The first half of the audio tape considers … . The second half of the audio tape considers ... . *Now listen to Audio Tape 1, Band 4, 'Fixed points and invariant lines'.*	To study this section you will need an audio CD player and CDA5493. In the audio band we use … . The first half of the audio band considers … . The second half of the audio band considers ... . *Now listen to CDA5493 (Tracks 11 - 18), band 4, 'Fixed points and invariant lines'.*

Course video

The MS221 video contains two types of video material. Some of the bands are linked directly to the main course texts, and should be used when indicated by these texts and on the Study Calendar. However, the 'Algebra workout' bands cover more general techniques in algebra, taking you through the basics step-by-step.

The video materials for MS221 were originally presented on video cassette. For that reason, you may come across old references to tapes or cassettes, whereas the material is now presented in digital format. You should also note the following adjustments to the text referring to the video material.

Reference	*Current text*	*Replacement text*
A2 page 4	Section 1 requires the use of a video player, …	Section 1 requires the use of a DVD player, …
A2 page 6	To study Subsection 1.1, you will need a video player and the Video Tape.	To study Subsection 1.1, you will need a DVD player and DVD00095.
A2 page 8	*Now watch Video Band A(iii), 'Visualising conics'.*	*Now watch band A(iii), 'Visualising conics'.*
A3 page 4	Section 2 requires the use of a video player, …	Section 2 requires the use of a DVD player, …
A3 page 15	To study Subsection 2.1, you will need a video player and the Video Tape. *Now watch Video Band A(v), 'Visualising isometries'.*	To study Subsection 2.1, you will need a DVD player and DVD00095. *Now watch band A(v), 'Visualising isometries'.*
B3 page 47	Now would be a good time to watch the optional band of the Video tape. *Now watch Video Band B(iv), 'Weaving spirals'.*	Now would be a good time to watch the optional band on DVD00095. *Now watch band B(iv), 'Weaving spirals'.*

Video Band B(iv) Weaving spirals

The Video Band shows Mathcad being used. This is a previous version of Mathcad from the one currently used on MS221, though there is no difference in the way the two versions work, as far as this Video Band is concerned.

Enrichment material

Enrichment material is provided on DVD00096 and DVD00097, and consists of fifteen programmes which were originally broadcast on television. The programmes make up the series *Seeing through mathematics* which is common to the three courses in the Mathematics Entry Suite: MU120 *Open Mathematics*; MST121 *Using Mathematics*; MS221 *Exploring Mathematics*. The programmes are designed to enhance and extend the mathematics discussed in the entry suite and are not course specific. Of the fifteen maths entry suite programmes some are more closely related to particular parts of MST121 and MS221 than others, as indicated below. These programmes are <u>not</u> an essential part of the course and are not necessary viewing to complete the course. However, the course video bands are integral your study of MS221 and you will be directed from the course text to use those videos at the appropriate time.

Programme	**MST121 Chapter**	**MS221 Chapter**
Taking off	A1	
Wood, brass and baboon bones		A1
The rainbow	A2	
A source of inspiration		A2, D1
Caught in time		A2
Blue haven	B1	
The true nature of geometry		B1
Designer rides	C1, C2	
The spiral of silence	D3	
The passionate statistician	D4	

(vii) Handbooks

You can take the Handbook into the examination at the end of the course. It is therefore very much in your interests to start using it right from the beginning of the course. You will then become familiar with the material contained in the Handbook and its layout.

You may annotate the Handbook in any way you wish, though you may not add extra pages. However, you are advised to be cautious in the amount of annotation you add at the beginning of the course; later you will have a better idea of what additions will be most useful to you. Try to use your Handbook as you work on your assignments and when you receive feedback on them. If you find that a result you have used is not given, or is given in too condensed a form to be helpful to you, then it may well be worth adding or amplifying that result before the examination.

If you are studying MST121 as well as MS221 together, you are strongly advised to use the MS221 Handbook rather than the MST121 one. The MS221 Handbook contains all the necessary material from MST121 as well as that for MS221.

(viii) Exercise Booklets

There are sufficient activities and exercises within each chapter to give you practice in the skills necessary to do the TMA and CMA questions. However, many students find it useful to have some additional exercises involving the main mathematical ideas in each chapter, and these are contained in the Exercise Booklets and form an extra, optional, part of the course. You should use them as it suits you: for extra practice as you go along; for revision prior to the examination; or not at all.

(ix) Submitting assignments

When you send in an assignment you are strongly advised to keep a copy for your own records. Please use A4 paper for your TMAs, and put your name and student number on each page, and number the pages. TMAs should ***not*** be sent using Recorded Delivery, but it is recommended that you obtain proof of posting and write your address on the back of the envelope. Please ensure that the postage covers the weight of your envelope and contents, as underpaid postage may mean a delay in your TMA being marked.

We have found that some students spend excessive time on word processing their assignments and on trying to achieve a perfection that adds a further burden to a busy study schedule. While tutors appreciate clear presentation that is easy to read, there is no requirement to use printout, other than that from Mathcad as requested in the assignments. Even if you prefer to use word processing for the 'words' of your assignment it is perfectly acceptable, and probably a better use of your time, to add in formulas and diagrams by hand (but check your work thoroughly before submission to ensure that it is complete). You should also bear in mind that your solutions in the examination will have to be handwritten, and so it is a good idea to give yourself practice in writing out your answers.

(x) References to MST121

In the MS221 materials you will find occasional references to items in MST121. These references are to the current editions of the MST121 Chapters, which were first used as follows: Block A in 2001; Block B in 2002; Block C in 2003; Block D in 2004. If you have copies of MST121 Chapters from an earlier year then some of the references will not correspond to your MST121 materials.

(xi) Calculators allowed in the examination

Any model of programmable and scientific calculator may be taken into the MS221 examination, but not those with QWERTY keyboards (or equivalent for other languages). Calculators with alphabetic keys not in the QWERTY layout, such as most graphics calculators, will be permitted. However, your calculator should not need to be plugged into

the mains, should not be capable of communicating remotely with other devices and should not emit any noise. You may take spare batteries, but the calculator instruction manual is not allowed.

(xii) Plagiarism

The University considers plagiarism to be a serious matter. We draw your attention to the full description of plagiarism contained in the Appendix of your Assessment Handbook. Please note that references to "assignments" should be taken to include any piece of work submitted for assessment, not just tutor-marked assignments.

3 General course information

(i) The MS221 eDesktop website

MS221 has an online presence to support teaching and learning activities, in the form of a course website (eDesktop). The purpose of this website is to keep you in touch with last minute news affecting your studies and also to provide useful supporting information, as necessary. *It is important to note that the course-related documents available via the eDesktop are generally duplicates of material which has already been sent to students in hardcopy. All necessary documents will continue to be sent to students in hardcopy, so the eDesktop is just an alternative way of accessing information, such as that in this Stop Press.*

Your eDesktop is accessible from the OU Student Home website http://www.open.ac.uk/students, where it will be shown as one of the online resources allocated to you in your personal area entitled 'Your links'. You will need to use the OU computer name and password.

The MS221 eDesktop contains the Latest Course News and also the following information:

- Course Resources (link to course material and online resources)
- Study Calendar (an online version of the study calendar)
- Conferencing (a link to FirstClass conferencing)
- Your FirstClass mailbox (e-mail)

The eDesktop also has links to the Student Home website and other OU websites.

(ii) OUSA FirstClass conference

Many courses have an on-line conference on FirstClass run by the Open University Students Association, the purpose of which is to provide students with a forum in which to exchange information about the course (within certain rules). The OUSA conferences are open to all students and everyone using them must abide by the OU FirstClass Code of Conduct.

These conferences can be accessed by clicking on the blue 'Open University' shield on your FirstClass desktop, which will take you to the 'OU Students Association' green logo. Once in the 'OU Students Association' area you will see a blue icon named 'OUSA Study Rooms Door': by clicking on it the OUSA Maths & Computing Room area will appear and the conference for your course can be found in there.

Alternatively, you can access the conference via the StudentHome website at http://www.open.ac.uk/students/. Once authenticated, there will be a link called '**MS221** FirstClass Desktop'. Then follow the links: 'OU Community'; 'Open University'; 'OU Students Association'; 'OUSA Study Rooms Door'; then as above.

You will also see a direct link to the course conference from the eDesktop for your course.There is no expectation that tutors (or any other member of OU staff) will look at or respond to messages in the OUSA conferences, though some may choose to do so. If students have a query to which they would like a tutor to respond then they should contact their own tutor or, failing that, one of the people listed in the Additional Tutorial Help (see section 3(vii) of this Stop Press). Where a tutor does choose to respond to a message on the OUSA conference it should be recognised that they are doing so on a purely voluntary basis.

(iii) Working with computers and the Online Applications CD-ROM

In this mailing you will find a copy of the Online Applications CD-ROM. This CD-ROM contains the OU Computing guide and some general software tools that you might find useful but are not required for this course.) Using the CD-ROM is straightforward – just put it in your computer and it should start. If you would like more guidance, read the booklet that comes in the CD-ROM case. If you would like further advice or support with installing OU supplied software please contact our Computing Helpdesk details of which can be found in the Online Applications booklet.

There is a lot of software on the CD-ROM, only a few items of which are relevant to this course. Other items are there because students on other courses need them and you should ignore them. Much of the software is freely available on the internet, but we have provided it on this CD-ROM to save you time and effort should you need it.

One item we would like to draw your attention to is Adobe Reader. You will need this if you want to read texts from the course website. You may already have this on your computer (try reading one of the texts and see if it works), if not, you will need to install it.

If you work online it is important that your computer is protected against malicious programs including computer viruses. If you have no other security software installed, the two Kaspersky security products on the CD-ROM can help. Read about 'Safe Computing' in the Computing Guide if you want to know more.

The University takes the issue of safe computing very seriously, and recommends that all its staff and students take precautions to ensure that their computers are not vulnerable. To help you do this, the Faculty of Mathematics and Computing has created a website and email bulletin service, which describes possible security issues, and suggests what you might do to protect your computer. It is particularly important that you take action if you are regularly going on-line, whether for your OU work, or otherwise, but the advice is intended for all computer users. The information and advice can be found at: http://safecomputing.open.ac.uk

(iv) Fibonacci numbers

Section 2 of Chapter A1 of MS221 discusses Fibonacci numbers and the golden ratio. If you would like to find out more on this topic, then information is available at the time of writing at http://www.mcs.surrey.ac.uk/Personal/R.Knott/Fibonacci/fib.html or http://www.newton.cam.ac.uk/wmy2kposters/january/.

(v) Websites for Chapter B1

If you study the (optional) Chapter B1 Subsection 4.3 (in Computer Book B), then you will see explorations of general quadratic iteration sequences. One function generating such a sequence is $f(x) = ax(1\text{-}x)$, and the behaviour of sequences arising from this function is similar to that described in the text. If you have a Java-enabled browser, you may be interested in the following websites to see interactive staircase and cobweb diagrams for these sequences.
(a) http://www.apmaths.uwo.ca/~bfraser/version1/iterated.html This site (which uses r for the parameter in place of a) allows you to set values for r and for x_0, and shows the cobweb diagram building up step by step. It also shows the corresponding bifurcation diagram.
(b) http://www.lboro.ac.uk/departments/ma/gallery/doubling/index.html This site gives the opportunity to alter both x_0 and a continuously, so that you can readily locate particular cycle behaviour (though the numerical values leading to given outcomes are not indicated).
Note that the terms of a sequence arising from $x_{n+1} = ax_n(1- x_n)$ are related to those of a sequence arising from $x'_{n+1} = (x'_n)^2 + c'$ (as in Computer Book B) via the scaling and shift given by $x'_n = a(1/2 - x_n)$, where $c' = (1/2)a - (1/4)a^2$. Hence the parameter range $-2 \le c' \le 0$ (examined in Computer Book B) corresponds to $2 \le a \le 4$, though the diagrams on these sites both cover the wider range $0 \le a \le 4$.

(vi) Queries and how to make contact

Course-related queries

Generally your tutor should be your first point of contact, especially for queries on any aspect of the course including suspected errors. If your query concerns the content of the course and you cannot contact your tutor then you can try the *Additional Tutorial Help*, which is a back-up facility run by members of the Faculty – see the next sub-section.

If all this fails then you can contact the Course Team with non-urgent queries (for example, to provide general feedback) by writing to the following address.

MST121/MS221 Course Manager
Faculty of Mathematics and Computing
The Open University
Walton Hall
Milton Keynes MK7 6AA

If your problem is urgent (for example, it affects a forthcoming assignment) then please email the Course Team at mcs-course-enquiries@open.ac.uk or telephone 01908 652716, stating clearly your name, student number and the course code. After a few rings you will either be able to speak with a member of staff or you will hear a recorded message. Please leave your message, including your name and student number, speaking clearly and slowly, so that we may help you as quickly as possible.

Additional Tutorial Help and help with Mathcad

Below is a list members of the Faculty of Mathematics and Computing who have offered to answer questions about MS221 with their telephone number and / or email address and the times when they are likely to be available. Please note the following if you use this service.

1. Your tutor, if available, should be the first point of contact for a course-related query. The additional tutorial help is a back up.
2. The people on the list are normally available at the times listed, but holidays and other commitments may make them unavailable on certain occasions.
3. Please note that phone numbers for evenings and weekends are volunteers' home numbers, and for these it will usually not be appropriate to leave a message asking to be called back(unless the number has an asterisk). Please try the number again later or try another number on the list.
4. Some people have provided an e-mail address. Please note that they may be unable to check their mail, and therefore you might not get an immediate response. If you do not receive a reply within 24 hours please either try a phone number or another person.
5. Although assignment questions are not excluded as sources of queries, you should expect the amount of information provided in response to such a query to be limited in fairness to other students. (Assignments should be your own work, since in general the grades obtained on them count towards your overall course assessment.)
6. When you use the additional tutorial help please mention that you are studying MST121, as the people may be answering questions about several courses.
7. It is a good idea to have pencil and paper handy and any course material that may be relevant. Please also give the relevant text reference to the person answering your call.

Name	Availability	Contact
Ian Harrison	Tuesday & Friday 10.00 - 16.00	0161 956 6861*
Mike Simpson	Any weekday 09.00 - 17.00	020 7485 6597*
Derek Goldrei	Monday 1800 - 2000	01865 559403
Kathleen Quinn	Tuesday & Wednesday 20.45 – 22.00	01908 561321
John Newton	Any weekday 19.30 - 21.30	0191 281 7371 e-mail: j.e.newton@open.ac.uk
Maurice Kennedy	Tuesday 14.00 - 16.00	02890 245025
John Trapp	Tuesday 19.00 - 22.00	01223 812120

Computer related queries

The OU Student Computing Helpdesk deals with course-related, technical computing queries, for all students currently studying a course with a computing element. The staff can provide help in getting the course software installed and running on your computer. They can sometimes also help with the basic use of the course software and interpreting software errors. (They are, however, unable to help with technical problems that are directly related to your computer operating system, its hardware or your Internet Service Provider. The Helpdesk can only give assistance on software supplied to you in relation to your current course.) If you have problems with the course software, please check with the Helpdesk before returning a CD-ROM as faulty. They may be able to offer a solution without you needing to wait for the disk to be exchanged for a new one.

The Helpdesk can also help if you should have problems using your OU Computer Username and associated password to gain access to any of the University's networked computing services. You can also request a new password from the *Forgotten your password?* option when you attempt to sign in to your *Student Home* page at http://www.open.ac.uk/students/ .

Website: **http://www.open.ac.uk/students/helpdesk**

The website contains details of known problems and solutions for many course software packages. We would advise that, where possible, you check the website first, before contacting the Helpdesk by one of the alternative methods listed below, to see if the solution to your problem has already been documented.

Phone: **+44 (0) 1908 653972**

The Helpdesk can be contacted between the hours of 09:00 and 22:30 (UK time), 7 days a week. However, it will be closed for staff training between 15:00 and 16:00 every Wednesday afternoon. Most Bank Holidays are covered from 10:00 to 16:00 assuming sufficient staff volunteers, but the Helpdesk will close completely on New Year's Day, Easter Sunday, Christmas Day and Boxing Day. During busy periods your telephone call may be placed in a queue. This does not mean that the staff are not there, just that they are busy with other calls. Your patience at these times is appreciated and your call will be answered as soon as possible. Priority is given to telephone queries over other methods of contact, to minimise costs where possible.

Email: **LTS-Student-Helpdesk@open.ac.uk**

When sending an email please make sure that the subject field of the message contains your 8-character Personal Identifier and your current course code. If you are contacting the Helpdesk with an issue related to an OU Username and/or password, please also include the word **Password** in the subject field.

Letter: **OU Computing Helpdesk, The Open University, Walton Hall, Milton Keynes, MK7 6AA**

When contacting the Helpdesk, whether by telephone or by one of the alternative methods, please always supply your student number (Personal Identifier) and course code, together with full and exact text and error codes of any error messages etc that your computer or software has given, if applicable.

Administrative queries

It is important that you have your student number (PI number) ready to quote.

Sometimes students call the Faculty with queries that would be more easily answered in other areas of the University. This can be frustrating, particularly if you have been redirected before speaking to someone who can help you. Below are contact details for various areas of the University, which you can keep for quick reference. Queries about the content of the course should be addressed to your tutor or to the Course Manager as indicated earlier in this section. The Course Manager may also be able to deal with administrative queries but please try the numbers below first where your problem seems to involve one of the areas named. The telephone number and address of your Regional Centre is in your Assessment Handbook.

There is an additional evening service which aims to provide help to students who are unable to make contact with their Regional Centre during the day. The service is run by a team of student service assistants, advisors and associate lecturers between 5.00 pm and 9.00 pm, Monday to Friday, (excluding Bank Holidays) and between 9.00 am and 5.00pm on Saturdays. The telephone number is 0870 3331444. Calls are charged at the national rate. Your query will be dealt with nationally but, if appropriate, referred back to Student Services in your Regional Centre the next working day.

Nature of Query	Contact	Telephone No / Fax / email
Registration problems		
e.g. Change of course What to do about materials received for a course declined. Withdrawals	Registration and Fees Centre or Student Services Section in Regional Centre	Tel: 01908 653454 Fax: 01908 654914 reg-fees@open.ac.uk
Awards	Awards and Ceremonies Centre	Tel: 01908 653003 Fax: 01908 654814 acc-gen@open.ac.uk
Credit transfer queries	Credit Transfer Centre	Tel: 01908 653077 Fax: 01908 654918 credit-transfer@open.ac.uk
Fees		
e.g. Fee queries; refunds	Registration and Fees Centre or Regional Centre	Tel: 01908 653454 Fax: 01908 654914 reg-fees@open.ac.uk
Queries about fee payment by instalments	OU Students Budget Account Office	Tel: 01908 655777 Fax: 01908 654903 ousba@open.ac.uk
Mailings		
Missing items in mailings or any queries about contents and timings of mailings	Despatch Services, as detailed at the bottom of any Contents Checklist.	Tel: 01908 233842 Fax: 01908 856611 Distribution-Helpdesk@open.ac.uk
Assignments		
TMA queries	Assignment Handling	Tel: 01908 654330 assignments@open.ac.uk
CMA queries/late submission	Assignment Records	Tel: 01908 653702 Fax: 01908 655716 assignments@open.ac.uk
TMA/CMA grades will **not** be discussed: only queries about receipt of assignments etc. Possible errors, marks awarded or late submission of TMAs should be discussed with your tutor.		
Regional Arrangements		
Tutorials / Day Schools Tutor Allocations Exam Centres and special arrangements Course choice, qualifications advice, Vocational Guidance.	Contact Student Services staff in your own Regional Centre " "	

(vii) The M500 Society

Joining the M500 Society could be a way of alleviating the isolation of studying maths alone. It is a society for OU students, staff and friends, which through a magazine published several times a year, provides a forum for discussion, comment and argument, as well as fun! The Society also publishes a directory of members who agree to be sources of help and advice on listed courses. It runs a popular weekend each September for exam preparation, for which members get a discount, as well as a weekend in January for mathematical fun. Please send stamped A5 envelope for membership form and free magazine to: Glenda Franklin, New Members Secretary, 16 Warbank Close, Alvechurch, Birmingham B48 7PA. There is also an OUSA FirstClass conference for M500.